

# Correlation among quality of life and physical activity

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# Correlation among quality of life and physical activity toward body age, hydration and fat percentage

*Korelacja między jakością życia i aktywnością fizyczną a wiekiem ciała, poziomem nawodnienia i procentem tkanki tłuszczowej*

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## Abstract

**Introduction.** Having good healthy habits and making physical activity a lifestyle is everyone's dream. Along with improving the quality of life and physical activity, it is expected to affect a person's body age, hydration level, and fat percentage. **Methods.** This research is an analytic observational study conducted with a cross sectional approach. Observational analytical research is done by observing, without any action from the researcher. The research subjects were 35 students. Students with cardiovascular and respiratory disorders, who were on an exercise program, and had a history of fractures in the past 3 months or deformities of the arms, were excluded from this study. Students who were 18-21 years old, had a BMI below 30, and did not smoke or drink alcohol were involved in this study. **Results.** Significant correlation with p-value<0.01 in causality relationship between body age and hydration with Pearson value -0.751, body age and fat percentage 0.773, and Pearson value hydration and fat percentage -0.990. In addition, a significant correlation between quality of life and hydration has a Pearson value of -0.338. Quality of life and physical activity are not related and have a p-value of 0.39. **Conclusion.** The relationship between body age and hydration, and hydration with fat percentage has a very significant positive relationship. However, quality of life has no correlation with physical activity.

## Key words:

quality of life, physical activity, body mass

## Streszczenie

**Wstęp.** Posiadanie dobrych, zdrowych nawyków i uczynienie z aktywności fizycznej stylu życia to marzenie każdego. Oczekuje się, że poprawa jakości życia i aktywności fizycznej wpłynie na wiek ciała, poziom nawodnienia i zawartość tkanki tłuszczowej. **Metody.** Niniejsze badanie jest analitycznym badaniem obserwacyjnym prowadzonym w podejściu przekrojowym. Obserwacyjne badania analityczne odbywają się poprzez obserwację, bez żadnego działania badacza. Przedmiotem badań było 35 studentów. Z badania wykluczono studentów z zaburzeniami sercowo-naczyniowymi i oddechowymi, którzy uczestniczyli w programie ćwiczeń i mieli w przeszłości złamania lub deformacje ramion. W badaniu wzięli udział studenci w wieku 18-21 lat, z BMI poniżej 30, którzy nie palili i nie pili alkoholu. **Wyniki.** Zaobserwowano istotną korelację o wartości  $p < 0,01$  w związku przyczynowo-skutkowym między wiekiem ciała a poziomem nawodnienia z wartością Pearsona -0,751, wiekiem ciała i zawartością tkanki tłuszczowej 0,773, i wartością Pearsona dot. nawodnienia i zawartością tłuszczu -0,990. Ponadto, zaobserwowano istotną korelację między jakością życia a poziomem nawodnieniem o wartości Pearsona -0,338. Jakość życia i aktywność fizyczna nie są ze sobą powiązane i ich wartość  $p$  wynosi 0,39. **Wniosek.** Zaobserwowano istotną pozytywną korelację pomiędzy wiekiem ciała a poziomem nawodnienia, oraz poziomem nawodnienia a zawartością tłuszczu. Jednak nie zaobserwowano korelacji między jakością życia a aktywnością fizyczną.

## Słowa kluczowe

jakość życia, aktywność fizyczna, masa ciała

## Introduction

Everyone wants health by carrying out a healthy lifestyle and physical activity as their habit, not least in their late teens. Judging from the age group, adolescents can be divided into three levels, namely early adolescents (10-13 years), middle adolescents (14-16 years), and late adolescents (17-19 years). According to the fact that we know lately, most teenagers follow unhealthy habits and prefer to do everything instantly, they don't care about the importance of maintaining health. This condition occurs because their activities take up a lot of time and energy, making them forget to maintain fitness and the importance of physical health. Basically, physical health is influenced by several factors as mentioned by WHO [13] such as personal habits, educational factors, environment, and heredity factors. They added that genetic factors, age, gender, level of activity during physical activity, physical health conditions, nutritional fulfillment, non-smoking habits, and rest periods can affect a person's physical health.

Nowadays, people are busy with their disorganized lifestyle. The financial aspect and their needs make most of them from various social strata try to achieve what they need without prioritizing their health. Work pressure can have a negative impact on their health condition. In addition, busy people find it difficult to allocate time to work for the purpose of their financial and physical health needs, because they do not have free time or feel tired to exercise [39].

Along with the development of the era where technology helps humans in many ways, they use technology facilities excessively rather than using them positively and wisely, this condition makes body functions become unbalanced. Excessive use of technology makes people lazy to do activities, cannot maintain the quality of actual social interactions, and their health will decline over time. Social media and technology have a negative impact on human life and health, both physically and mentally [35]. One of the negative effects of excessive use of technology is sleeping late at night or insomnia (difficulty sleeping). This condition will interfere with the condition of the personal body. This fact is supported by the length of time people work in front of a laptop or gadget continuously and minimize physical activity due to sitting in a chair for a long time. In addition, smoking, drinking alcohol and consuming drugs can have a negative impact on health [39].

In addition, consuming instant food or junk food and skipping breakfast can make a person more susceptible to disease. Canned junk food and instant food are definitely contaminated with preservatives or chemicals from the can itself. Asp [4] explained that some canned foods contain a chemical called BPA (Bisphenol A) which is a substance that can break down hormones and cause several diseases such as heart attacks, obesity, diabetes, and reproductive problems. The same problem can occur in those who skip breakfast. Breakfast habits are important considering the benefits that can be obtained. Some of the benefits are maintaining weight, lowering cholesterol levels, and improving heart function. A healthy lifestyle is the simplest way to improve or develop the quality of life. Some effective habits to maintain one's health such as doing physical activity regularly, prioritizing physical activity in various aspects of life such as going somewhere by wal-

king or cycling, cleaning the house, and farming or farming [8]. Regular physical activity or exercise can reduce the risk factors for several chronic diseases such as hypertension, stroke, osteoporosis, diabetes, metabolic disorders, and obesity. In addition, the psychological benefits of doing exercise every day such as reducing depression and post-traumatic stress, acute stress, anxiety and emotional exhaustion, etc. [2].

A healthy lifestyle and physical activity affect the quality of life. Routine physical activity will provide several benefits for the human body if it is carried out with aspects of FITT (Frequency, Intensity, time, type). Applying the principles of FITT when doing exercise or other physical activities can have a positive effect on body health to achieve functional, physiological and psychological goals [24]. Frequency is the time a person does physical activity in a week. Ideally, the frequency of exercise is 3-5 days per week. Intensity means how hard the exercise activity is, whether it's low intensity, medium intensity, or high intensity level. Time refers to the duration of exercise or physical activity performed in one session. While the type is a variation of exercise. The type of exercise can be different such as aerobic and anaerobic exercise. Keeping the FITT principles in mind during exercise will be more beneficial and controllable than not applying the FITT principles. Regarding the time it takes to exercise or do physical activity, a study has shown that dividing the duration of exercise into several parts of the day will provide the same benefits as doing exercise for a long time. For example, someone can do physical activity in 30 minutes by dividing it into 3 training sessions, namely 10 minutes per session or 15 minutes per session. Exercise and physical activity should be done in at least 10 minutes per session. Some activities are easy to follow such as preferring the use of the stairs over the elevator, or one has to take the distance from the parking area to the entrance. This will make a person take the time to walk and make his body active and give them the opportunity to move more than usual [20].

Currently, cycling is becoming a trend as a healthy lifestyle at all ages. People from young to adults make cycling as a new hobby to meet the needs of a healthy life. This trend is beneficial because it has a positive effect on their physical and psychological health. The benefits of cycling for health arise because when cycling, they can feel the environment such as beautiful scenery, beautiful scenery and situations. Cycling will slowly relax their bodies and minds. However, when someone is doing outdoor activities, it is better to choose a nice place with minimal air pollution. Although it does not provide a significant difference in the benefits of exercise function, it can affect a person's respiratory system. Air pollution can have a negative impact on breathing because it will be difficult to breathe and feel uncomfortable [37].

As we noted earlier, physical activity can have a significant effect on mass gain and fat percentage control. Muscle and fat have an important role in body age, hydration, and fat percentage. Body age refers to health and physical fitness rather than chronological age. Body age instrument is used to calculate body age based on the percentage of skeletal muscle and fat. If skeletal muscle is in better condition than the percentage of body fat, it can be assumed that the body age is in normal condition or may be better than chronological age. Conversely, if the

percentage of fat is higher than skeletal muscle, it means that the body age is worse than chronological age or known as premature aging. This condition is mentioned in a study conducted by Andrieieva, et al. [3] which says that a decrease in body age or biological age will make people have a low life expectancy, it can interfere with the function of vital organs, the body becomes difficult to adapt to certain conditions such as environmental temperature, and a decrease in body temperature, general health conditions.

In addition to affecting the age of the body, physical activity can also affect a person's hydration. Hydration is a human need in meeting fluids for the body. The human body cannot survive long without fluids because 55-60% of body weight is fluid. The balance of the body's metabolism is important when exercising, and water can ensure the body's own metabolic condition is good [29]. Hydration problems will be related to the possibility of cases of dehydration resulting in decreased physical activity. The importance of keeping the body hydrated such as maintaining kidney function, increasing body metabolism, and developing cognitive abilities and maintaining a good mood [6].

As is well known that physical activity will have a positive impact on building the body and controlling body fat percentage. Fat is considered a negative substance that causes several dangerous diseases. In fact, some diseases are not caused by the fatty substance itself, but a high percentage of fat and not matched by physical activity to use fat as energy for activities, sports, etc. The amount of fat in the body, if used for energy by doing exercise or exercise, can be controlled. On the other hand, if fat is not used for energy, it will settle in the body and will increase along with food consumption. This condition will cause several diseases.

Although considered to be the cause of several diseases, fat has many benefits for the human body, such as replacing the function of protein as energy, aiding digestion, covering inter-

nal organs, protecting the body from low temperatures, helping to dissolve vitamins such as vitamins A, D, E, and K. , fat is used for hormone-forming substances, developing cholic acid, maintaining the gallbladder, and as a food substitute [30]. Therefore, this study aims to determine the effect or correlation between quality of life and physical activity on body age, hydration, and fat percentage.

**Methods**

This research is an analytic observational study which was conducted using a cross sectional approach. It focuses on measuring or observing time in a single action performed on the dependent and independent variables. Observational analytic research is carried out by observing without any action from the researcher. The research subjects were 35 students, consisting of 25 male students and 10 female students from 2 universities in Indonesia and Malaysia. Students who had cardiovascular and respiratory problems, followed an exercise program, and had a history of fracture in the last 3 months or deformity of the upper arm were excluded from this study. Students aged 18-21 years, having a BMI below 30 and not smoking and consuming alcohol were involved in this study.

The quality of life questionnaire instrument uses the Health Related Quality of Life from the RAND 36-Items Health Survey, while the physical activity uses the G-PAQ (Global Physical Activity Questionnaire). In addition, the components of the independent variables in this study were body age, hydration and fat percentage obtained using Omron Karada Scan Digital Body Composition.

**Result**

This observational analytical study produced data on quality of life, physical activity patterns, body age, hydration and fat percentage. The relationship between the five variables is described in table 1.

**Table 1. Correlation**

Variables		Body age uny	Hydration (%)	Fat percentage (%)	GPAQ uny	Quality of Life uny
Body age uny	Pearson Correlation		-0.751**	0.779**	-0.057	-0.048
	Sig. (2-tailed)		0.000	0.000	0.745	0.783
Hydration (%)	Pearson Correlation	-0.751**		-0.990**	-0.133	0.338*
	Sig. (2-tailed)	0.000		0.000	0.447	0.047
Fat Percentage (%)	Pearson Correlation	0.779**	-0.990**		0.107	-0.301
	Sig. (2-tailed)	0.000	0.000		0.541	0.079
GPAQ uny	Pearson Correlation	-0.057	-0.133	0.107		-0.150
	Sig. (2-tailed)	0.745	0.447	0.541		0.390
Quality of Life uny	Pearson Correlation	-0.048	0.338*	-0.301	-0.150	
	Sig. (2-tailed)	0.783	0.047	0.079	0.390	

\*\* Correlation is significant at the 0.01 level (2-tailed); \* Correlation is significant at the 0.05 level (2-tailed).

Pearson  $-0.751$  (very significant negative correlation), body age and fat percentage with a Pearson value of  $0.779$  (very significant positive correlation), hydration and fat percentage with a Pearson value of  $-0.990$  (very significant negative correlation). Furthermore, the significant correlation of quality of life on hydration with a Pearson value of  $0.338$  (significant positive correlation). Quality of life and physical activity are not related to each other and have a p-value of  $0.39$ .

### Discussion

If you relate the quality of life and physical activity with body age, hydration and fat percentage, it will produce a new picture of the relationship between the five variables. The impact of quality of life and physical activity is estimated to affect body age, hydration and fat percentage. Body age, hydration, and fat percentage were obtained through anthropometric calculations using bioimpedance. Aspects that must be considered are gender (female) or bone maturity [23]. The findings of this study showed a significant correlation with p value  $<0.01$  on the relationship between body age and hydration with a Pearson value of  $-0.751$  (very significant negative correlation, percentage of body age on fat with a Pearson value of  $0.779$  (very significant positive correlation), hydration on fat percentage with a Pearson value of  $-0.990$  (very significant negative correlation). In addition, there is a significant relationship between quality of life on hydration with a Pearson value of  $0.338$  (significant positive correlation). Quality of life and physical activity are not related to each other and have a p  $0.39$ .

Understanding the negative correlation of the relationship between body age on hydration and hydration on the percentage of fat illustrates that when the body ages it shows a decrease in hydration, while the increase in hydration in the percentage of fat will decrease. It can be concluded that the effects obtained are opposite to each other. The relationship between body age and hydration has a Pearson value of  $-0.751$  (very significant negative correlation), body age to fat percentage has a Pearson value of  $0.779$  (very significant positive correlation). Body age is a body condition that identifies age based on fat percentage and skeletal muscle condition. Body age is known as biological age. Used to measure the health of the body based on the ability of organ function. In addition, biological age is used as a reference to determine the estimated life expectancy, measure the health of organ function, and to determine appropriate treatment for medical purposes [21]

Through statistical data analysis, researchers found that body age has a negative correlation with hydration, meaning that the higher the body age, the lower the hydration status. On the other hand, body age has a positive effect on fat percentage. This means that the older the body, the higher the percentage of fat. Increased fat will cause cardio-metabolic disease [34]. In other words, the condition of the body will worsen as the percentage of fat increases. Following this research explains that an unhealthy lifestyle and poor eating habits will increase the risk of obesity [38].

Obesity is a condition in which the percentage of body fat is

high which results in an imbalance in body weight. Obesity is the effect of many factors such as energy imbalance, drug consumption, and genetic factors [19]. This is one of the causes of several diseases such as type 2 diabetes, cardiovascular problems, cancer triggers, and mental and psychological problems [18]. Based on research conducted recently, it was found that obesity can also affect the condition of people who are more susceptible to Covid-19, this is because obesity has an impact on psychological problems that lower the immune system in the body.

As we know, Covid-19 is a disease that is becoming a pandemic or a global disease at this time. This disease first appeared in Wuhan, China in December 2019, and was identified by WHO (World Health Organization) as SARS-COV2 or known as COVID-19 (Corona Virus Disease-2019) on January 9, 2020 [27]. Covid-19 is called a pandemic because this virus spreads around the world in a short time through physical interaction. Some of the symptoms that appear when exposed to Covid-19 such as fever, pain, fatigue, dry cough, and lymphopenia (blood lymphocyte condition less than 1500 per microliter of blood). Most patients with cardiovascular problems, heart attacks, kidneys, and malignant tumors have a higher risk of exposure to Covid-19 [11]. Covid-19 cases are not only bad for health but also make people uncomfortable to do physical activities or sports outdoors. This is due to the implementation of government regulations regarding self-quarantine to stop the spread of Covid-19. However, people should not use government regulations as an excuse to be lazy and do nothing while at home. People should exercise to develop their immunity.

Some examples of physical activity or exercise while at home, such as moving heavy furniture such as sofas, tables, wardrobes, etc. while cleaning and rearranging furniture. This activity is beneficial for the health of the body, because it can strengthen muscles and create a new atmosphere in the room that can reduce the level of boredom and stress. Other examples of physical activity during self-quarantine and physical distancing such as walking around the house area, going up and down stairs, home workouts using simple equipment such as chairs, dumbbells or body weight exercises such as push ups, sit ups, and skipping [7].

Focusing on recent health problems, several prevention methods such as boosting the immune system by consuming fruits and vegetables, eating nutrient-rich foods, getting enough rest, exercising and exercising, managing stress, adopting a clean and healthy lifestyle, and keeping the body from stress. dehydration. by drinking water for active people and when the temperature is high. Drinking water can reduce the risk of dehydration where the body's condition lacks water supply. Dehydration makes the body weak, tired, and increases the risk factors for illness [1].

Humans can live 30 days without eating, but 4-10 days without drinking. Drinking water has benefits for the body, 75% for supporting muscles and 20% for cellular systems [5]. Generally, daily water consumption is 2-2.7 L/day for women and 2.5-3.7 L/day for men [15]. It can be concluded that the fulfillment of water intake is as important as doing physical activity or sports to maintain a healthy body. As we know,

drinking water is useful in pandemic situations, because when people meet their water intake, their immunity will be stronger [36] and increase physical performance for daily activities (Cherian, 2020). Body fluid balance is determined by fluctuations in water levels in the body, while hydration is a body process to balance water intake (Liska, et. al. 2018).

Given the importance of drinking water, WHO [25] says that the need for drinking water is a human right. This statement is true because drinking water that is of poor quality or contaminated with harmful substances will have a negative impact on public health. If you consume poor quality water due to an imperfect sanitation system, it will cause several problems such as cholera, diarrhea, polio, and dysentery. Percentage of hydration and fat obtained Pearson value  $-0.990$  (very significant negative correlation). In other words, the higher the hydration level, the lower the fat percentage. Better fluid composition in the body indicates better energy utilization ability. That is, the process of producing energy becomes easier, such as burning fat into energy [22]. Fatty foods are not good for the human body, this fact is known by most people [10]. This statement is supported by research findings that the percentage of fat is negatively correlated with hydration, but positively correlated with body age. Fortunately, when it was found that hydration or water intake had a correlation to weight loss or fat loss [40]. Previous research investigated the relationship between water intake and changes in body weight or body composition, which means it is related to body age. The finding is that increasing water intake will contribute to controlling body fat or losing weight for obesity [26]. While the correlation between quality of life and hydration has a Pearson value of  $0.338$ , has a significant positive correlation which means that quality of life will determine the level of hydration as evidenced by the percentage level of body fluids. This fact is supported by previous research which states that increased hydration determines an increase in quality of life [12]. There are several types of hydration based on the source such as pure water either boiled or drunk directly; processed water such as fruit juices, soft drinks, tea, coffee, milk, and infused water (fruit or vegetables soaked overnight in purified water); water from eating fruits such as oranges, pears, mangoes, and papayas; and then water from eating food such as from porridge and soup. However, good water consumed and beneficial for the body is not too much sugar. Consuming soft drinks and alcohol will have a bad impact on the body.

Of all the components in this study, the hydration variable had a significant correlation for most of all components such as body age, fat percentage, and quality of life, meaning that hydration was most related to other variables. These findings show that hydration is very important for people's lives. When a person loses 2% of body fluids, it can be categorized as dehydration and loss of quality of performance, work ability,

and imbalance [33]. Rosenthal [32] adds that the majority of people are categorized as dehydrated, this condition will increase risk factors for dangerous diseases such as premature aging, muscle pain and headaches at some point, hypertension, and most likely obesity. The reason why people don't like drinking water, especially water, is because of its taste. Most people prefer to consume sugary drinks over water, which means it is also harmful to their health. To make water tastier, Rosenthal suggests adding a squeeze of lime, apple, cucumber, pear, or any other fruit to mix the juice with the water.

On the other hand, the relationship between quality of life and physical activity does not have a significant relationship. The reason is, the quality of life is not only determined by physical activity but also many other factors such as physical, psychological, social, and environmental factors that will affect the quality of life. Without ignoring social and environmental factors, the dominant psychological factors affect the quality of life [31]. However, Mexitalia [30] in her research said that rural adolescents had lower nutritional levels than urban adolescents, they were more active and had higher physical fitness than urban adolescents.

However, daily exercise has many benefits for improving body function and developing daily physical activity. In addition, Zhang, et al. [41] found that there are several body repair functions in active people such as stronger muscles, walking speed, mobility, body balance, and physical performance, especially for adults. In addition, exercise or exercise can maintain psychological and mental health, improve mood, reduce the risk of depression, anxiety, unstable emotions, improve memory and thinking skills, and information processing. Simple exercises such as yoga, athletic sports, and meditation can reduce negative feelings that arise from your own thoughts. People can benefit during 5-6 months of practice. Control of thoughts and emotions is very important because they can affect the personal immune system. If a person has unstable emotions, they will be at high risk for several health problems [14].

#### Conclusions and Suggestions

There is a relationship between body age and hydration, the percentage of hydration to fat which has a very significant negative correlation. In addition, the relationship between body age and the percentage of fat is very significantly positively correlated, while the quality of life is not associated with physical activity.

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